

RESPONSE

In the Office Action, claims 1-17 are rejected under 35 USC 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter regarding as the invention. Specifically, claims 1, 2, 13 and 14 are cited as failing to set forth a basis for the weight percent of alkylene oxide groups and claims 7 and 8 are deemed confusing in what further limitations are being set forth. With regard to the basis for the weight percent of alkylene oxide groups, this would be understood by one skilled in the art to be the (meth)acryloyl-functional polyurethane, and is also evident from the examples and description. However, it is believed that the claims, as amended herein, fully address the rejections under 35 USC 112.

Claims 1-17 are also rejected under 35 USC 103(a), as being unpatentable over CA 2269412 in view of EP 424705. This rejection is respectfully traversed.

CA 2269412 relates to UV-curable aqueous coating compositions comprising (meth)acryloyl functional polyurethanes, optionally additional polyisocyanates, a UV initiator, and active hydrogen containing compounds. It teaches that the incorporation of urethane (meth)acrylates into aqueous binders may be facilitated by preparing the urethane (meth)acrylates from polyisocyanates which were rendered hydrophilic. Hydrophilic properties can be imparted anionically, cationically or non-ionically via internal or external emulsifiers such as polyethers (see page 6, lines 7 – 12). CA 2269412 thus describes six different ways to impart hydrophilic properties. The content of internal alkylene oxide (i.e. polyether) groups of the (meth)acryloyl functional polyurethane according to the present claim 1 is neither mentioned nor suggested in CA 2269412.

Further the weight average molecular weight of the (meth)acryloyl functional polyurethanes is not explicitly mentioned in CA 2269412. However, in Examples 1 and 2 (see page 10, line 27 to page 11, line 21) the preparation of (meth)acryloyl-functional

polyurethanes is described. According to CA2269412, the (meth)acryloyl-functional polyurethanes are prepared by the addition reaction of an isocyanurate of hexamethylene diisocyanate, i.e. a trimer of hexamethylene diisocyanate having a theoretical molecular weight of 504, and hydroxyethyl acrylate, which has a molecular weight of 116. Accordingly, the theoretical molecular weight of the (meth)acryloyl-functional polyurethane amounts to $504 + 3 \times 116 = 852$.

EP 0424705-A relates to nonionically and partially anionically stabilized waterdispersible polyurethane/acrylic graft copolymers. The graft copolymers comprise an acrylic backbone with pendant polyurethane graft side-chains (see page 3, lines 40-41). The polyurethane macromonomer has a weight average molecular weight of 3,000 to 20,000 (see page 5, lines 48 – 49). The polyurethane/acrylic graft copolymer has a weight average molecular weight of 15,000 to 60,000 (see page 6, lines 15 – 18). Hence, the predominant weight portion of the polyurethane/acrylic graft copolymer is provided by the acrylic backbone. The weight percent of alkylene oxide segments in the final polyurethane/acrylic graft polymer ranges between 5% and 25% by weight of the total resin (see page 5, lines 14 - 17). The weight percent of alkylene oxide in the ethylenically terminated polyurethane macromonomers of Examples 1 to 4 is 59.46% (see page 7, line 56, to page 8, line 1), 66.4% (see page 8, lines 25 – 27), 54.8% (see page 8, lines 49 -51), and 58.3% (see page 9, lines 13 – 15), respectively, based on the weight of the polyurethane macromonomer.

In summary, CA 2269412 relates to low molecular weight (meth)acryloyl-functional polyurethanes, whereas EP 0424705-A relates to high molecular weight polyurethane/acrylic graft copolymers wherein the predominant weight portion of the polyurethane/acrylic graft copolymer is provided by the acrylic backbone and which have no (meth)acryloyl functionality. Thus, the two references relate to completely different types of polymers. Accordingly, the assertions in the office action that the incorporation of alkylene oxide groups within methacryloyl-functional polyurethanes in amounts that overlap the currently claimed amounts was known at the time of the invention cannot be supported by EP 0424705-A. The teaching of the alkylene oxide

content of 5% to 25% by weight relates the polyurethane/acrylic graft copolymers of EP 0424705-A only, but not to (meth)acryloyl-functional polyurethanes. A skilled person trying to render the (meth)acryloyl-functional polyurethanes of CA 2269412 hydrophilic would not consult a document relating to completely different polymers such as EP 0424705-A in order to search for a suitable amount of alkylene oxide. Even if, in arguendo, a skilled person would nevertheless refer to EP 0424705-A for a suitable alkylene oxide content of acryloyl-functional polyurethanes, such a skilled person would be taught from Examples 1 to 4 that suitable amounts of alkylene oxide in meth(acryloyl)-functional polyurethanes range between 54.8% and 66.5% by weight, based on the weight of the polyurethane. Thus, the skilled person would not arrive at the subject-matter of instant claim 1 by combining CA 2269412 and EP 0424705-A.

Thus, for the reasons set forth above, the present invention is considered non-obvious over the cited art. Applicants respectfully request reconsideration of the rejected claims and a finding that the claims are in condition for immediate allowance.

Respectfully submitted,

Keimpe Jan VAN DEN BERG, et al.



Michelle J. Burke

Reg. No. 37791

Attorney for Applicants

Akzo Nobel Inc.
Intellectual Property Dept.
7 Livingstone Avenue
Dobbs Ferry, NY 10522-3408
(914) 674-5459